CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the May/June 2013 series

0648 FOOD AND NUTRITION

0648/01 Paper 1 (Theory), maximum raw mark 100

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the May/June 2013 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

Section A

	Answer	Mar	
1 (a)	*Elements in protein* oxygen; nitrogen; phosphorus; sulphur;	max	
(b)	*High Biological Value protein* contains all essential / indispensable amino acids; in sufficient amounts / in correct proportion;	[2]	
(c) (i)	*Animal sources of HBV protein* meat; fish; cheese; eggs;	[1]	**R** milk as given in question
(ii)	*Non-animal source of HBV protein* soya beans;	[1]	
(d)	*Functions of protein* growth; repair; maintenance; energy; production of hormones / enzymes / antibodies;	max [4]	Any 4 at 1 mark each.
(e)	*Digestion* stomach rennin - clots milk - pepsin - converts proteins to peptides / polypeptides / peptones - duodenum trypsinogen - from pancreatic juice - mixes with enterokinase - to form trypsin - converts proteins to peptides / polypeptides / peptones - ileum erepsin - from intestinal juice - converts peptides / polypeptides / peptones to amino acids - *Absorption* walls of ileum - lined with villi - finger-like projections - increase surface area - walls of villi are one cell thick - supplied with blood capillaries - amino acids absorbed into blood capillaries - dissolve in blood - join blood circulation -	max [6]	2 points needed for 1 mark. Must show good understanding for full marks.

2	**(a)**	*Functions of water* supports structure of vital organs - 70% body is water; required for body fluids - blood, mucus, saliva, sweat, urine; controls body temperature - perspiration cools surface; some nutrients dissolve in water for absorption –eg.vitamins B and C, glucose; removal of solid waste - absorbed by NSP to keep faeces soft; removal of toxins etc. - in urine from kidneys; lubricates joints e.g. knee - prevents ends of bones wearing away by grinding; part of metabolic reaction – digestion; keeps linings of mucous membranes moist - prevents infection / barrier against bacteria;	**max [6]**	
	(b)	*Condition caused by lack of water* dehydration;	**[1]**	
	(c)	*Symptoms of dehydration* headache / tiredness;	**[1]**	
3	**(a)**	*Energy value of 1g carbohydrate* 4 kcals / 3.75 kcals / 16 kJ; *Energy value of 1g fat* 9 kcals / 38 kJ;	**[2]**	
	(b)	*Individual energy requirements* (Age) young children usually more active / elderly people less active; (Gender) men tend to have a larger overall body size / need more energy for maintainance; (Stage of growth) require more energy when growing to produce more cells; (Occupation) sedentary workers less active then manual workers; (State of body) during pregnancy additional energy needed for growth of foetus / during lactation more energy needed for production of milk; (Health) metabolism may be raised during illness / less energy due to reduced physical activity / may need energy for production of new cells after injury; (BMR) Basal Metabolic Rate is different for each individual, i.e. amount of energy required to keep alive when warm and at rest;		NO MARKS FOR IDENTIFYING FACTORS Any 4 explanations at 1 mark each.

		(Body size) more surface area requires more energy to maintain;		
	(c)	*Energy balance* energy input = energy output; OR kcals consumed is exactly the right amount to fulfil body's needs;	**[1]**	
4	**(a)**	*Ways to reduce sugar* do not add to hot drinks; use artificial sweeteners; choose low calorie / diet soft drinks; reduce consumption of cakes and biscuits; reduce consumption of sweets and chocolate; avoid sugar-coated breakfast cereals; choose canned fruit in fruit juice, not syrup; reduce proportion of sugar in cakes and biscuits; sweeten cakes with dried fruit, fresh fruit;	**[3]**	Any 3 at 1 mark each
	(b)	*Effects on the body of high sugar diet* bacteria - act on sugar on teeth - forms plaque - sugar converted to acid - dissolves enamel - tooth decay - gum disease - bad breath - excess sugar converted to fat - stored - under skin - adipose tissue - around internal organs - obesity - CHD - low self-esteem - breathlessness - lethargy - arthritis - hypertension - arteries narrow - block - stroke - diabetes mellitus - insufficient insulin made - in pancreas - glucose remains in blood	**[6]**	2 points needed for 1 mark. Must show good understanding for full marks.
			Total:40	

Section B

5 (a)	*Method of making cake* creaming method; OR all-in-one method / one-stage method;	**max [**	
(b)	*One ingredient to vary flavour* grated orange / lemon rind; vanilla / almond / coffee essence; cocoa; mixed spice / ginger; dried fruit / cherries; chopped apple / pineapple / banana;	**max [1]**	
(c)	*Ingredients to increase NSP / dietary fibre* replace flour with wholemeal flour; add, coconut / dried fruit or example / chopped apple / pineapple / banana / nuts or example / grated vegetables e.g. carrot;	**max [2]**	Any 2 at 1 mark each
(d)	*Gases which help cake to rise* carbon dioxide; steam; air;	**max [2]**	Any 2 at 1 mark each
(e)	*Other changes which take place during baking* fat melts - absorbed by starch - sugar melts - caramelisation on surface of cake - protein coagulates - sets shape of cake - starch absorbs liquid from egg - gelatinises - surface browns - starch dextrinises - liquid from egg evaporates - steam helps to raise mixture - carbon dioxide given off from baking powder - expands mixture - effect of moist heat - expands mixture - Maillard browning - reaction between sugar and protein - crust forms - as surface dries in heat of oven	**max [5]**	2 points needed for 1 mark. Must show good understanding for full marks.

(f) (i)	*Choice of sugar* caster sugar**;** small crystals - easier to cream - and trap air - dissolved by warmth caused by friction - when creaming - gives a smooth texture; not granulated sugar; - larger crystals - do not dissolve - speckled appearance to finished cake - as sugar caramelises soft brown sugar; - colour - flavour;	**max [**	
(ii)	*Choice of fat* butter; for colour - and flavour; margarine; colour - not as good a flavour as butter - cheaper than butter; soft margarine; creams easily -; spreads should not be used; high water content - alters proportions - will not hold air during creaming;	**max [2]**	max 1 mark for fat max 1 mark for reason
6 (a)	*Use and care of a refrigerator* use food in rotation - prevents waste - bacteria still multiply - but more slowly - wipe milk bottles - to prevent dirt from outside being brought in - keep raw and cooked food separate - prevent cross-contamination - raw meat at bottom - prevent juices dripping onto cooked food - temperature must be between 1°C and 7°C - to slow down growth of micro-organisms - do not put hot food into refrigerator - increases temperature inside - check 'use by' dates - throw away old food - may already be contaminated - may contaminate other foods - cover strongly-smelling food - e.g. cheese, onions, fish - to prevent tainting of other food - clean containers - to ensure free from bacteria - prevent cross-contamination - clean regularly - to remove spills - ensure free from bacteria - cover / wrap food - to prevent drying - do not overcrowd - to allow cold air to circulate - keep door closed - to avoid loss of cold air - saves fuel - keep vegetables in crisper at bottom - retain moisture - do not use detergent for cleaning - taints food - use bicarbonate of soda to remove stubborn marks	**max [5]**	2 points needed for 1 mark. Must show good understanding for full marks.

(b)	*Air as a raising agent* gives a light texture - no change in colour - or flavour - must be introduced before cooking - expands on heating - cold air expands more than warm air - sieving - flour / dry ingredients - air trapped between grains - creaming fat and sugar - traps tiny bubbles of air - rich cakes - rubbing in fat and flour - air trapped as mixture falls into bowl - shortcrust pastry - whisking egg white - meringues - ovalbumin stretches - entangles 7 x own volume of air - whisking whole egg and sugar - traps less air - due to fat in egg yolk - Swiss roll - folding and rolling - flaky pastry / puff pastry- air trapped between layers - sealed to prevent loss - trapped air expands on heating - pushers layers apart	**max [5]**	
(c)	*Advantages and disadvantages of using a microwave oven* ***Advantages*** quick - saves fuel - cook and serve in the same dish - saves washing up - kitchen does not get hot - no preheating of oven needed - food does not burn on dish / sides of oven - oven easy to clean - portable - no need for special electrical installation - ***Disadvantages*** food does not brown - flavours not developed - dish does not become crisp - 'hot spots' may develop - food needs stirring during cooking - only suitable for thin or small pieces of food - impossible to judge when food is cooked - easy to overcook food -		2 points needed for 1 mark. Must show good understanding for full marks.
7 (a)	*Nutrients in red meat* protein; fat; iron; nicotinic acid / niacin; thiamine / aneurin; riboflavin (or vitamin B once); vitamin A; vitamin D;	**[4]**	Any 4 at 1 mark each.

(b)	*Causes of toughness* long / thick muscle fibres / in old animal; from well-used part of animal / large amount of connective tissue; meat not allowed to hang after slaughter;	**max [**	
(c)	*Tenderising meat by moist method of cooking* insoluble collagen; converted to soluble gelatine; muscle fibres loosen;	**[3]**	
(d) (i)	*Moist methods of cooking* stewing / braising / boiling / steaming;	**[1]**	
(ii)	*Dry methods of cooking* roasting / baking / frying / grilling / BBQ;	**[1]**	
(e) (i)	*Conduction* heat energy from heat source passes to adjoining molecule; molecules vibrate cause neighbouring molecules to vibrate; transfer, vibrations / heat energy, from one molecule to the next; requires contact with a source of heat (e.g. oven shelf, hotplate); heat is conducted at varying rates through different substances; metals are good conductors; wood, plastic are poor conductors;	**max [4]**	Any 4 at 1 mark each.
(ii)	*Convection* baking / roasting / boiling / steaming / deep frying;	**[1]**	
		Total:45	

Section C

8 (a)	*Discuss the importance of fruit in the diet and suggest ways in which it could be used in the preparation of family meals.* **<u>Nutrients in fruit</u>** carbohydrate / sugar for, energy - e.g. bananas, grapes, mango, pears, dried figs, dates, sultanas - fat for, energy / warmth / insulation - e.g. avocado pear - beta-carotene - precursor of vitamin A for, mucous membranes / visual purple / night vision- e.g. apricots, mango, melon, peaches vitamin C for, absorption of iron / teeth and gums / prevent scurvy / healthy skin e.g. oranges, lemons, blackcurrants, grapes, strawberries etc. - nicotinic acid for release of energy - e.g. avocado pear, dried apricots, dates, figs - calcium for, bones and teeth / clotting blood / function of nerves and muscles - e.g. blackcurrants, dried apricots, figs - iron for, formation of haemoglobin / prevent anaemia – e.g. avocado pear, dried apricots, figs **<u>Other reasons for including fruit in the diet</u>** high water content - refreshing - quick snack - easy to carry - little or no preparation required – good source of NSP - filling if on weight-reducing diet - for efficient working of digestive tract - variety of flavour - variety of colour - make meals attractive - variety of texture - can be eaten raw or cooked- many ways of serving - in sweet or savoury dishes - can be preserved at home - cheap when in season - easily available - quick to prepare and cook - can enjoy food from other countries - canned fruit often cheaper than fresh - e.g. peaches, pineapples - can be stored at home - used in emergencies **<u>Ways of including fruit in family meals</u>** as a drink - eg orange juice / banana smoothie- in ice cream - eg strawberry, lemon sorbet - hot dessert – eg Eve's pudding / apple pie / pineapple upside	2 p Mu full • • • nutrients • gives several other factors on importance of fruit • range of different uses of fruit in family meals • names dishes which include fruit • information is specific • information is usually accurate • all areas of the question addressed

	down pudding – cold dessert – eg lemon meringue pie / fruit salad scones – eg apple / sultanas / cherries cakes – eg apple / cherry / sultanas / banana accompaniments – eg apple sauce with pork / pineapple with ham / bananas with curry - preserves – eg marmalade / strawberry jam / lemon curd - main dish – eg in curry / sweet and sour chicken - decoration – eg lemon wedges / glace cherries -	
(b)	*Discuss the importance of eggs in the diet and suggest ways in which they could be used in the preparation of family meals.* **<u>Nutritional Value</u>** protein / ovalbumin / mucin / HBV - for, growth / repair / energy / hormones / antibodies / enzymes - fat - for, emulsion / energy / warmth / insulation - iron - for, formation of haemoglobin / red pigment / transports oxygen / prevention of anaemia - beta-carotene / vitamin A - for, mucous membranes / healthy skin / visual purple / night vision - vitamin D - for, absorption of calcium / bones / teeth riboflavin / from B group - releases energy from carbohydrates - lecithin - emulsifier - water - for, temperature maintenance / body fluids **<u>Uses of eggs</u>** trapping air - whole eggs with sugar - in Swiss roll - egg white - traps 7 x own volume of air - ovalbumin stretches - meringue lightening - whisked egg white in mousse - thickening - custard / sauce / soup - protein coagulates at 60°C - emulsifying - lecithin in egg yolk is emulsifying agent - mayonnaise binding - rissoles / fishcakes - coagulation of protein setting - quiche / baked cake - coagulation of protein	2 points needed for 1 mark. Must show good understanding for full marks. eg. • names several nutrients in eggs • give some functions of nutrients • range of uses in family meals • named examples of uses • information is specific • correct terminology is used • information is usually accurate • all areas of the question addressed

	coating - with breadcrumbs or flour - forms a seal around food - on fish - prevents absorption of fat / breaking up / protects glazing - egg white / egg yolk / whole egg - on pastries / bread - to give shine - browns on heating - denaturation of protein- enriching - of sauces / soup / milk pudding - adds HBV protein- garnishing - hard-boiled eggs on salads - separated egg white and egg yolk on dressed crab - main dish - boiled /poached / scrambled etc. - easily digested - quick to cook - source of HBV protein - inexpensive - clarifying - whisked egg white in consommé / mint jelly versatile - for sweet and savoury dishes	